A Powerful New Capability for the Investigation of Rare Earths and Actinides

Understanding the electronic structure of rare earths elements and actinides is crucial to the development of 21st century materials that will meet the nation's strategic energy needs. In a recent publication[1], a team from the Lawrence Livermore National Laboratory (LLNL) reported results of electronic structure measurements on Ce oxide using a new and unique capability — the Resonant Inverse Photoelectron Spectroscopy (RIPES) technique. With these measurements, it is possible to directly access the unoccupied density of states in revealing and unprecedented ways. In the case of Ce oxide, these results confirm the physical picture of resonance enhancement with electron localization. This work is the result of collaboration between scientists at LLNL, the Missouri University of Science and Technology, and Uppsala University in Sweden.

1. J.G. Tobin, S.W. Yu, B.W. Chung, G.D. Waddill, L. Duda and J. Nordgren, "*Observation of Strong Resonant Behavior in the Inverse Photoelectron Spectroscopy of Ce Oxide*," Phys. Rev. B **83**, 085104(2011).

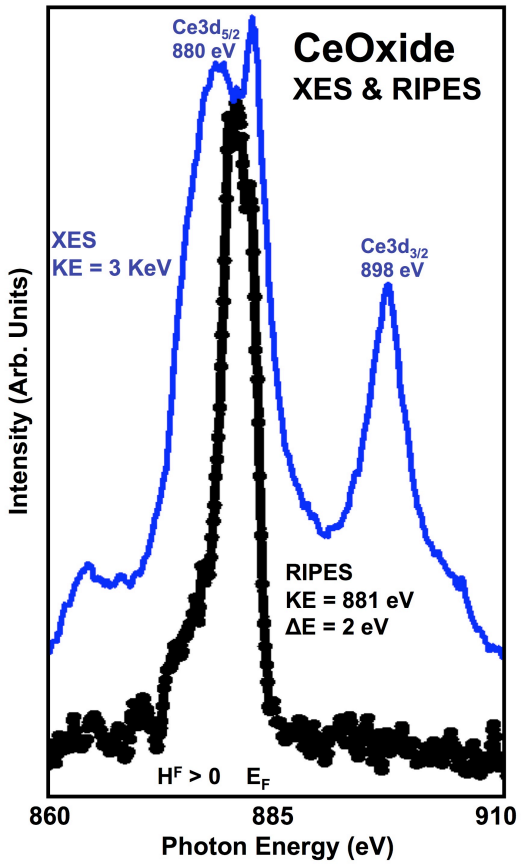

Figure Caption:
First results of X-ray Emission Spectroscopy (XES) and Resonant Inverse Photoelectron Spectroscopy (RIPES) measurements on a rare earth element (4f electron) system, Cerium Oxide. KE is kinetic energy. ΔE is the experimental band-pass. E_F denotes the Fermi Energy. H^F denotes the energy of the state relative to E_F.